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ROSS WINANS, PLAINTIFF IN ERROR, v. ADAM, EDWARD, AND
TALBOT DENMEAD.

A patent was taken out for making the body of a burden railroad car of sheet iron, the upper part being cylindrical, and the lower part in the form of a frustum of a cone, the under edge of which has a flange secured upon it, to which flange a movable bottom is attached.

The claim was this. "What I claim as my invention and desire to secure by letters-patent, is, making the body of a car for the transportation of coal, &c., in the form of a frustum of a cone, substantially as herein described, whereby the force exerted by the weight of the load presses equally in all directions and does not tend to change the form thereof, so that every part resists its equal proportion, and by which also the lower part is so reduced as to pass down within the truck frame and between the axles, to lower the centre of gravity of the load without diminishing the capacity of the car as described. I also claim extending the body of the car below the connecting pieces of the truck frame and the line of draught, by passing the connecting bars of the truck frame and the draught bar, through the body of the car substantially described."

This patent was not for merely changing the form of a machine, but by means of such change to introduce and employ other mechanical principles or natural powers, or a new mode of operation, and thus attain a new and useful result.

Hence, where, in a suit brought by the patentee against persons who had constructed octagonal and pyramidal cars, the District Judge ruled that the patent was good for conical bodies, but not for rectilinear bodies, this ruling was erroneous.

The structure, the mode of operation, and the result attained, were the same in both, and the specification claimed in the patent covered the rectilinear cars. With this explanation of the patent, it should have been left to the jury to decide the question of infringement as a question of fact.

THIS case was brought up by writ of error from the Circuit Court of the United States for the District of Maryland.

It was an action brought by Ross Winans for the infringement of a patent-right. The jury, under the instruction of the District Judge, the late Judge Glenn, then sitting alone, found a verdict for the defendants; and the plaintiff brought the case to this court by a writ of error.

The nature of the case is set forth in the explanatory statement prefixed to the argument of the counsel for the plaintiff in error.

It was argued by *Mr. Latrobe*, for the plaintiff in error, and by *Mr. Campbell*, for the defendant in error.

Statement and points of plaintiff in error.

On the 26th June, 1847, Ross Winans, the plaintiff in error, obtained letters-patent of the United States, for a new and useful improvement in cars for transportation of coal, &c.

The occasion for the invention thus patented, and the principle of it, are well set forth in the specification, thus, —

"The transportation of coal, and all other heavy articles in lumps, has been attended with great injury to the cars, requir-

ing the bodies to be constructed with great strength, to resist the outward pressure on the sides, as well as the vertical pressure on the bottom, due, not only to the weight of the mass, but the mobility of the lumps amongst each other, tending 'to pack,' as it is technically termed. Experience has shown, that cars on the old mode of construction cannot be made to carry a load greater than their own weight; but, by my improvement, I am enabled to make cars of greater durability than those heretofore made, which will transport double their weight of coal.

"The principle of my invention, by which I am enabled to obtain this important end, consists in making the body, or a portion thereof, conical, by which the area of the bottom is reduced, and the load exerts an equal strain on all parts, and which does not tend to change the form, but to exert an equal strain in the direction of the circle; at the same time this form presents the important advantage, by the reduced size of the lower part thereof, to extend down within the truck and between the axles, thereby lowering the centre of gravity of the load."

The specification then gives a detailed description of the mode of constructing the cars in question, and proceeds thus:—

"What I claim as my invention, and desire to secure by letters-patent is, making the body of a car for the transportation of coal, &c., in the form of a frustum of a cone, substantially as herein described, whereby the force exerted by the weight of the load presses equally in all directions, and does not tend to change the form thereof, so that every part resists its equal proportion, and by which also the lower part is so reduced as to pass down within the truck frame, and between the axles, to lower the centre of gravity of the load, without diminishing the capacity of the car as described."

And the specification concludes with a claim for a portion of the construction, not important in this connection.

From the testimony it appears that cars, constructed by the plaintiff, in accordance with the specification, while they weighed but 5,750 lbs. each, carried 18,550 lbs. of coal—making the weight of the load, in proportion to the weight of the car, as 3.3 to 1—that the thickness of the sheet iron used in the construction of the bodies was but 3.32ds of an inch, and that the dimensions of the band around the top were $\frac{1}{4}$ of an inch by 2 inches; and it is further shown, in illustration of the importance of the invention, that the plaintiff had constructed a model car, which, weighing but $2\frac{1}{2}$ tons, carried, nevertheless, $9\frac{1}{2}$ tons of coal "in perfect safety and satisfactorily from Cumberland to Baltimore." The proportion of the weight of the car, in this instance, to the weight of coal carried in it, was as 1 to $\frac{1}{4}$ nearly. It appears further, from the testimony, generally, that

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the cars referred to were used in the transportation of coal from the mines near Cumberland to Baltimore.

It then appears that the defendants, "in view for a call for cars from the mining roads near Cumberland," in 1849, '50, required their draftsman, Cochrane, to get up a car that would suit their purposes; that he went to the Reading road, and "finding nothing there, returned to Baltimore, and went to the plaintiff's shops, where he saw a car nearly finished, which he examined and measured." That it first occurred to him to make a square car, but that, as this would interfere with the wheels, he made an octagonal one.

Another witness proves, that the iron used in the car, thus built by the defendants, was of the same thickness as that used by the plaintiff, to wit, 3.32ds of an inch, while the band around the top was of the same thickness, — to wit, $\frac{1}{4}$ of an inch, and $1\frac{1}{2}$ inches in width.

It thus appears that a patent was granted, in 1847, to Ross Winans for a car for carrying coal, whose merits may be summed up thus; — that it carried more coal in proportion to its own weight than any car previously in use, and that the load instead of distorting it, preserved it in shape, acting as a framing.

These eminent advantages, which increased the available power of the locomotive engine, looking to revenue on coal as a freight, from 50 to 100 per cent. were to be attributed to the peculiar shape of the car body, consisting of a frustum of a cone, which permitted the use of iron, as thin as has been described, lessening, in proportion, the weight of the car, or the weight, the transportation of which by the locomotive gave no return in revenue; and it appears that, in view of obtaining the best results from his invention, the plaintiff, in 1849, '50, at the instance of the witness Pratt, perfected a model car for certain mining roads near Cumberland; — that this model car was examined and measured by the defendant's draftsman, to aid him in getting up coal cars for other mining companies in 1849 and 1850; and, subsequently, cars of the same weight of material in the bodies, which differed from the plaintiff's in this only, that while the latter were cylindrical and conical, the others were octagonal and pyramidal, — were built by the defendants, to the number of 24.

Believing that the cars thus built by the defendants were built in palpable violation of his patent, the plaintiff brought the present suit.

It will be seen, by examining the record, that the main question before the jury was, whether the cars, so built by the defendants, were substantially the same in principle and mode of operation with the car described and claimed by the plain-

tiff in his specification, and experts were examined on both sides on this point.

On the part of the defendants it was contended, that the cars of the defendants were octagonal in shape, while the plaintiff's were cylindrical.

On the part of the plaintiff it was insisted, that this was immaterial, provided the octagonal car obtained the same useful results, through the operation of the same principles in its construction; and it was suggested that, if the original construction of the body in right lines saved the infringement, an hundred-sided polygon would be without the patent; and also that, in point of fact, even the conical car was oftener a polygon than a true curve, owing to the character of the material from which it was built; and that if, by accident, it came from the shops a true theoretical cone, a day or two's use made a polygon of it; and that the immediate tendency of the load of coal, when put into an octagon car, was to bulge out its size and convert it into a conical one. All of which was urged for the purpose of showing that the question was necessarily a question as to whether the change of form was colorable or substantial—a question of fact, which it belonged to the jury to determine.

It is not necessary, in this statement, and in view of the questions arising on this appeal, to go into evidence in regard to the merely colorable difference of construction in detail. All the witnesses, on both sides, proved that the advantages which Winans proposed to obtain were substantially obtained in the defendant's cars—the plaintiff's witnesses swearing to the fact directly, and the defendant's witnesses admitting it on cross-examination; and the only testimony quoted now is that of the defendant's own and leading witness.

“That the advantage of a reduced bottom of the car thus obtained, whether the car was conical or octagonal; that the strengthening of the bottom, due to the adoption of the conical form, was the same when the octagonal form was adopted or the circular; that the circular form was the best to resist the pressure, as, for instance, in a steam boiler, and an octagonal one better than the square form; that the octagonal car was not better than the conical car; that for practical purposes, one was as good as the other; that a polygon of many sides would be equivalent to a circle; that the octagon car, practically, was as good as the conical one; and that, substantially, witness saw no difference between the two.”

The testimony must indeed be all one way, where the plaintiff is willing to rest his case on the defendant's own showing.

In the view of the plaintiff below, there were two questions; the first for the court; being the construction of the patent; the

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second for the jury, being the substantial, or only colorable difference between the cars in principle and mode of operation.

The plaintiff prayed the Circuit Court (his Honor, the late Judge Glenn, sitting alone) accordingly.

In framing the prayer for the court's construction of the specification, the language of the specification was adopted, in describing the object of the invention; and the court were asked to say to the jury "that what they had to look at was not simply whether, in form and circumstances, which may be more or less immaterial, that which had been done by the defendant varied from the specification of the plaintiff's patent, but to see whether, in substance and effect, the defendants, having the same object in view as that set forth in the plaintiff's specification, had, since the date thereof, constructed cars which, substantially, on the same principle and on the same mode of operation, accomplished the same result." And to give more certainty to the prayer, the plaintiff added the instruction as prayed for by him, "that to entitle the plaintiff to a verdict, it was not necessary that the body of the defendants' cars should be conical, in the exact definition of the term, provided the jury should believe that the form adopted by the defendants accomplished the same result, substantially, with that in view of the plaintiff, and upon substantially the same principle and in the same mode of operation."

The language of the first part of the prayer, here quoted, was taken *verbatim*, nearly, from the charge of Sir N. C. Tindal to the jury in the case of *Walton v. Potter and Horsfall*, Webster's Pat. Cases, 587.

This was a case where the plaintiff's patent was for the substitution of sheets of India rubber for leather for the insertion of the teeth, in the manufacture of cards for carding wool; and the infringement lay in the use of cloth saturated with a solution of India rubber for the same purpose; and the court, after determining the construction of the specification, gave substantially the same instruction that the plaintiff prayed for here. It is in this case that C. J. Tindal says, "That if a man has, by dint of his own genius and discovery, after a patent has been obtained, been able to give the public, without reference to the former one, or borrowing from the former one, a new and superior mode of arriving at the same end, there can be no objection to his taking out a patent for that purpose. But he has no right whatever to take, if I may so say, a leaf out of his neighbor's book, &c."

It would be hard indeed to find a case where the court's decision, applied to the facts in this cause, more completely negatived the right, set up by the defendants, to build the cars

which they did build; for here, the taking of the leaf out of the book is not left to inference, but day and date are given for the act.

To the same point is the case *Huddart v. Grimshaw*, also cited in the court below. Webster's Patent Cases, 95.

Here a patent had been obtained for making rope, a part of the process being the passage of the strands, while being twisted, through a tube; and it appeared that they had formerly passed through a hole in a plate. If the tube and the plate were the same, substantially, the difference being colorable only, then the patent was void, otherwise it was good; and the question was left to the jury, who found for the plaintiff.

To the same point is the case of *Russell v. Cowley & Dixon*, Webster's Patent Cases, 463.

This was the case of a patent for welding iron tubes, by drawing them, at a welding heat, through a conical hole. The infringement was the passing them between rollers; and the question of colorable or substantial difference, was referred to the jury.

So in the case of *Morgan v. Seaward*, Webster's Patent Cases, 170, which was upon Gallaway's patent for paddle wheels of steam-vessels, and where the question of infringement having arisen, the Court, Alderson, B., told the jury "that the question would be, simply, whether the defendant's machine was only colorably different; that is, whether it differed merely in the substitution of mechanical equivalents for the contrivances which were resorted to by the patentee." And after referring to points of construction, the court continues, "Therefore, the two machines were alike in principle; one man was the first inventor of the principle, and the other has adopted it; and though he may have carried it into effect by substituting one mechanical equivalent for another, still you (the jury) are to look to the substance, and not the mere form, and if it is in substance an infringement, you ought to find so."

So, too, in the case of *Crossley v. Beverly*, growing out of Clegg's patent for a gas meter; and referred to by Alderson, B., in the case of *Jupe v. Pratt* and others, Webster's Patent Cases, 144, as follows: "There never was a more instructive case than that. I remember very well the argument put by the Lord Chief Baron, who led on that case, and succeeded. There never were two things to the eye more different than the plaintiff's invention, and what the defendant had done in contravention of his patent-right. The plaintiff's invention was different in form; different in construction; it agreed with it only in one thing, and that was, by moving in the water. A certain point was made to open either before or after, so as to shut up another, and the

gas was made to pass through this opening; passing through it, it was made to revolve it; the scientific men, all of them, said, "the moment a practical, scientific man has got that principle in his head, he can multiply, without end, the forms in which that principle can be made to operate."

As in the case under discussion; the moment a practical, scientific man is furnished with the idea of giving to the car a shape which will, by dispensing with the framing ordinarily used, enable him to make it lighter in proportion to its load, than it has ever been made before, he can multiply without end the forms in which this principle can be made to operate. He can make the car a polygon of an hundred sides, of twenty sides, or of eight sides. He can vary the angle of the cone, or pyramid, through which the coal is discharged, *ad infinitum*. He can make the opening at the bottom larger or smaller to please his fancy. He can avail himself or not of the advantage of lowering the car, in position, so as to lower the centre of gravity. Still the question must always be, whether, whatever the shape he adopts, he is not availing himself of the principle first suggested by the patentee; a question which, in a court of law, is at all times a question not for the court, but the jury; after the former shall have given to the specification that construction which is to govern the latter in determining whether the infringement complained of falls, substantially, in principle and mode of operation, within the plaintiff's patent.

The authorities here cited, and which were relied on in the court below, are held to sustain the prayer of the plaintiff; that, having pronounced upon the construction of the specification, the question of infringement should be left to the jury.

The court below thought differently, however, and, rejecting the prayers of both plaintiff and defendants, instructed the jury, "That while the patent is good for what is described therein; a conical body in whole or in part, supported in any of the modes indicated for a mode of sustaining a conical body on a carriage or truck, and drawing the same, and for those principles which are due alone to conical vehicles and not to rectilinear bodies; and it being admitted that the defendant's car was entirely rectilinear, that there was no infringement of the plaintiff's patent." See Record, pages 16, 17.

Upon this instruction nothing was left for the jury but to render a verdict for the defendant. The court had not only settled the construction, but the infringement also.

The present appeal is from this decision of the late district judge.

The points of the plaintiff in error are,

1. That the court below erred in the construction which it

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gave to the specification, should it be held that this construction limited the plaintiff to the strictly conical form.

And upon this point the authority relied on is the patent itself.

2. That the court below erred, even supposing that its construction of the specification was correct, in excluding the inquiry whether the cars of the defendants were not substantially the same in principle and mode of operation with those of the plaintiff; admitting that these last were rectilinear in their sections and not curvilinear.

And upon this point the authorities relied on, are, *Walton v. Potter*, Webster's Patent Cases, 587; *Huddart v. Grimshaw*, Id. 95; *Jupe v. Pratt*, citing *Crossley v. Beverly*, Id. 144; *Morgan v. Seaward*, Id. 170; *Russel v. Crowley*, Id. 463; *Phillips on Patents*, 125, 6, 7.

(Infringement.) *Curtis on Patents*, 263, 265, 264, 5, 268; Citing, *Wyeth v. Stone*, 1 Story, 273; *Odiorne v. Winkley*, 2 Gall. 51; *Gray v. James*, Peters, C. C. R. 394; *Bovill v. Moore*, Dav. Pat. Ca. 361.

3. That the court below erred in taking the question of fact from the jury.

Upon which point the authorities already cited are relied on.

Defendant's Points.

The defendant in error submits that the court below was right in refusing the prayer on the other side and giving the instruction which it did.

1. As to the rejected prayer of the plaintiff.

This prayer asserted the essence of the invention to consist in the conical form adopted by the patentee, and rightly so asserted, but the conclusion thence drawn was a *non sequitur*. It was that any other form was a violation. Had the patent claimed the application of a principle operating through the form of a cone, and more or less through other forms, and claimed the principle or mode of operation through whatever shape permitted it, there would have been some ground for the deduction. But the claim is confined to a single form, and only through and by that form to the principles which it embodies; and if, out of many forms embodying more or less perfectly the same mode of operation, the plaintiff in error has made his choice of the best, he is confined to that choice and the rejection which it involves of all other forms less felicitous. It may be admitted, without hesitation, that the substitution of mechanical or chemical equivalents, as they are called, will not affect the rights of a patentee, but the cases in which this principle holds are where the *modus operandi* embraces more than a single way to reach the desired end. Where the invention consists of a principle embodied in

a single form, the form is the principle and the principle the form, and there can be no violation of the principle without the use of the form. *Davis v. Palmer*, 2 Brockenbrough, 309.

2. As to the court's instruction.

The construction of the patent was exclusively for the judge. He construed it correctly as embracing only a curvilinear form. It necessarily followed that, as the infringements relied on consisted only in the construction of rectilinear forms, there was no evidence to go to the jury of any violation of the patent, and it was proper in him so to instruct them. *Greenleaf v. Birth*, 9 Peters, 292.

Mr. Justice CURTIS delivered the opinion of the court.

This is a writ of error to the Circuit Court of the United States, for the District of Maryland. The plaintiff in error brought his action in that court for an infringement of the exclusive right to make, use, and sell "an improvement in cars for the transportation of coal," &c., granted to him by letters-patent, bearing date on the 26th day of June, 1847; and, the judgment of that court being for the defendants, he has brought the record here by this writ of error.

It appears, by the bill of exceptions, that the letters-patent declared on were duly issued, and that their validity was not questioned; but the defendants denied that they had infringed upon the exclusive right of the plaintiff.

On such a trial, two questions arise. The first is, what is the thing patented; the second, has that thing been constructed, used, or sold by the defendants.

—The first is a question of law, to be determined by the court, construing the letters-patent, and the description of the invention and specification of claim annexed to them. The second is a question of fact, to be submitted to a jury.

In this case it is alleged the court construed the specification of claim erroneously, and thereby withdrew from the jury questions which it was their province to decide. This renders it necessary to examine the letters-patent, and the schedule annexed to them, to see whether their construction by the Circuit Court was correct.

In this, as in most patent cases, founded on alleged improvements in machines, in order to determine what is the thing patented, it is necessary to inquire.

1. What is the structure or device, described by the patentee, as embodying his invention.

2. What mode of operation is introduced and employed by this structure or device.

3. What result is attained by means of this mode of operation.

4. Does the specification of claim cover the described mode of operation by which the result is attained.

Without going into unnecessary details, or referring to drawings, it may be stated that the structure, described by this patent, is the body of a burden railroad car, made of sheet iron, the upper part being cylindrical, and the lower part in the form of a frustum of a cone, the under edge of which has a flange secured upon it, to which flange a movable bottom is attached. This bottom is made movable, in order to discharge the load through the aperture left by removing it.

To understand the mode of operation introduced and employed by means of this form of the car body, it is only necessary to state, what appears on the face of the specification, and was testified to by experts at the trial as correct, that, by reason of the circular form of the car body, the pressure of the load outwards was equal in every direction, and thus the load supported itself in a great degree; that, by making the lower part conical, this principle of action operated throughout the car, with the exception of the small space to which the movable bottom was attached; that, being conical, the lower part of the car could be carried down below the truck, between the wheels, thus lowering the centre of gravity of the load; that the pressure outwards upon all parts of the circle being equal, the tensile strength of the iron was used to a much greater degree than in a car of a square form; and, finally, that this form of the lower part of the car facilitated the complete discharge of the load through the aperture, when the bottom was removed.

It thus appears that, by means of this change of form, the patentee has introduced a mode of operation not before employed in burden cars, that is to say, nearly equal pressure in all directions by the entire load, save that small part which rests on the movable bottom; the effects of which are, that the load, in a great degree, supports itself, and the tensile strength of the iron is used, while at the same time, by reason of the same form, the centre of gravity of the load is depressed, and its discharge facilitated.

The practical result attained by this mode of operation is correctly described by the patentee; for the uncontradicted evidence at the trial showed that he had not exaggerated the practical advantage of his invention. The specification states:

"The transportation of coal, and all other heavy articles in lumps, has been attended with great injury to the cars, requiring the bodies to be constructed with great strength to resist the outward pressure on the sides, as well as the vertical pressure on the bottom, due not only to the weight of the mass, but the mobility of the lumps among each other tending to 'pack,' as

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it is technically termed. Experience has shown that cars, on the old mode of construction, cannot be made to carry a load greater than its own weight; but, by my improvement, I am enabled to make cars of greater durability than those heretofore made, which will transport double their own weight of coal," &c.

Having thus ascertained what is the structure described, the mode of operation it embodies, and the practical result attained, the next inquiry is, does the specification of claim cover this mode of operation, by which this result is effected?

It was upon this question the case turned at the trial in the Circuit Court.

The testimony showed that the defendants had made cars similar to the plaintiff's, except that the form was octagonal instead of circular. There was evidence tending to prove that, considered in reference to the practical uses of such a car, the octagonal car was substantially the same as the circular. Amongst other witnesses upon this point was James Millholland, who was called by the defendants. He testified.

"That the advantage of a reduced bottom of the car was obtained, whether the car was conical or octagonal; that the strengthening of the bottom, due to the adoption of a conical form, was the same when the octagonal form was adopted, or the circular. That the circular form was the best to resist the pressure, as, for instance, in a steam boiler, and an octagonal one better than the square form; that the octagonal car was not better than the conical car; that, for practical purposes, one was as good as the other; that a polygon of many sides would be equivalent to a circle; that the octagon car, practically, was as good as the conical ones; and that, substantially, the witness saw no difference between the two."

The district judge, who presided at the trial, ruled,—

That while the patent is good for what [is] described therein, a conical body, in whole or in part, supported in any of the modes indicated for a mode of sustaining a conical body on a carriage or truck, and drawing the same, and to those principles which were due alone to conical vehicles, and not to rectilinear bodies, and it being admitted that the defendants' car was entirely rectilinear, that there was no infringement of the plaintiff's patent.

The substance of this ruling was, that the claim was limited to the particular geometrical form mentioned in the specification; and as the defendants had not made cars in that particular form, there could be no infringement, even if the cars made by the defendants attained the same result by employing what was in fact, the same mode of operation as that described by the patentee. We think this ruling was erroneous.

Under our law a patent cannot be granted merely for a change of form. The act of February 21, 1793, § 2, so declared in express terms; and though this declaratory law was not reenacted in the Patent Act of 1836, it is a principle which necessarily makes part of every system of law granting patents for new inventions. Merely to change the form of a machine is the work of a constructor, not of an inventor; such a change cannot be deemed an invention. Nor does the plaintiff's patent rest upon such a change. To change the form of an existing machine, and by means of such change to introduce and employ other mechanical principles or natural powers, or, as it is termed, a new mode of operation, and thus attain a new and useful result, is the subject of a patent. Such is the basis on which the plaintiff's patent rests.

Its substance is a new mode of operation, by means of which a new result is obtained. It is this new mode of operation which gives it the character of an invention, and entitles the inventor to a patent; and this new mode of operation is, in view of the patent law, the thing entitled to protection. The patentee may, and should, so frame his specification of claim as to cover this new mode of operation which he has invented; and the only question in this case is, whether he has done so; or whether he has restricted his claim to one particular geometrical form.

There being evidence in the case tending to show that other forms do in fact embody the plaintiff's mode of operation, and, by means of it, produce the same new and useful result, the question is, whether the patentee has limited his claim to one out of the several forms which thus embody his invention.

Now, while it is undoubtedly true, that the patentee may so restrict his claim as to cover less than what he invented, or may limit it to one particular form of machine, excluding all other forms, though they also embody his invention, yet such an interpretation should not be put upon his claim if it can fairly be construed otherwise, and this for two reasons:

1. Because the reasonable presumption is, that, having a just right to cover and protect his whole invention, he intended to do so. *Haworth v. Harcastle*, Web. P. C. 484.

2. Because specifications are to be construed liberally, in accordance with the design of the Constitution and the patent laws of the United States, to promote the progress of the useful arts, and allow inventors to retain to their own use, not any thing which is matter of common right, but what they themselves have created. *Grant v. Raymond*, 6 Pet. 218; *Ames v. Howard*, 1 Sumn. 482, 485; *Blanchard v. Sprague*, 3 Id. 535, 539; *Davoll v. Brown*, 1 Wood. & Minot, 53, 57; *Parker v. Ha-*

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worth, 4 McLean's R. 372; *Le Roy v. Tatham*, 14 How. 181, and opinion of Parke, Baron, there quoted; *Neilson v. Herford*, Web. P. C. 341; *Russell v. Cowley*, Id. 470; *Burden v. Winslow*, (decided at the present term,) 15 Howard.

The claim of the plaintiff is in the following words:

"What I claim as my invention, and desire to secure by letters-patent, is making the body of a car for the transportation of coal, &c., in the form of a frustum of a cone, substantially as herein described, whereby the force exerted by the weight of the load presses equally in all directions, and does not tend to change the form thereof, so that every part resists its equal proportion, and by which, also, the lower part is so reduced as to pass down within the truck frame and between the axles, to lower the centre of gravity of the load without diminishing the capacity of the car as described.

"I also claim extending the body of the car below the connecting pieces of the truck frame, and the line of draught, by passing the connecting bars of the truck frame, and the draught bar, through the body of the car, substantially as described."

It is generally true, when a patentee describes a machine, and then claims it as described, that he is understood to intend to claim, and does by law actually cover, not only the precise forms he has described, but all other forms which embody his invention; it being a familiar rule that, to copy the principle or mode of operation described, is an infringement, although such copy should be totally unlike the original in form or proportions.

Why should not this rule be applied to this case?

It is not sufficient to distinguish this case to say, that here the invention consists in a change of form, and the patentee has claimed one form only.

Patentable improvements in machinery are almost always made by changing some one or more forms of one or more parts, and thereby introducing some mechanical principle or mode of action not previously existing in the machine, and so securing a new or improved result. And, in the numerous cases in which it has been held, that to copy the patentee's mode of operation was an infringement, the infringer had got forms and proportions not described, and not in terms claimed. If it were not so, no question of infringement could arise. If the machine complained of were a copy, in form, of the machine described in the specification, of course it would be at once seen to be an infringement. It could be nothing else. It is only ingenious diversities of form and proportion, presenting the appearance of something unlike the thing patented, which give rise to questions; and the property of inventors would be valueless, if it

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were enough for the defendant to say, your improvement consisted in a change of form; you describe and claim but one form; I have not taken that, and so have not infringed.

The answer is, my improvement did not consist in a change of form, but in the new employment of principles or powers, in a new mode of operation, embodied in a form by means of which a new or better result is produced; it was this which constituted my invention; this you have copied, changing only the form; and that answer is justly applicable to this patent.

Undoubtedly there may be cases in which the letters-patent do include only the particular form described and claimed. *Davis v. Palmer*, 2 Brock. 309, seems to have been one of those cases. But they are in entire accordance with what is above stated.

The reason why such a patent covers only one geometrical form, is not that the patentee has described and claimed that form only; it is because that form only is capable of embodying his invention; and, consequently, if the form is not copied, the invention is not used.

Where form and substance are inseparable, it is enough to look at the form only. Where they are separable; where the whole substance of the invention may be copied in a different form, it is the duty of courts and juries to look through the form for the substance of the invention—for that which entitled the inventor to his patent, and which the patent was designed to secure; where that is found, there is an infringement; and it is not a defence, that it is embodied in a form not described, and in terms claimed by the patentee.

Patentees sometimes add to their claims an express declaration, to the effect that the claim extends to the thing patented, however its form or proportions may be varied. But this is unnecessary. The law so interprets the claim without the addition of these words. The exclusive right to the thing patented is not secured, if the public are at liberty to make substantial copies of it, varying its form or proportions. And, therefore, the patentee, having described his invention, and shown its principles, and claimed it in that form which most perfectly embodies it, is, in contemplation of law, deemed to claim every form in which his invention may be copied, unless he manifests an intention to disclaim some of those forms.

Indeed it is difficult to perceive how any other rule could be applied, practicably, to cases like this. How is a question of infringement of this patent to be tried? It may safely be assumed, that neither the patentee nor any other constructor has made, or will make, a car exactly circular. In practice, deviations from a true circle will always occur. How near to a

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circle, then, must a car be, in order to infringe? May it be slightly elliptical, or otherwise depart from a true circle, and, if so, how far?

In our judgment, the only answer that can be given to these questions is, that it must be so near to a true circle as substantially to embody the patentee's mode of operation, and thereby attain the same kind of result as was reached by his invention. It is not necessary that the defendant's cars should employ the plaintiff's invention to as good advantage as he employed it, or that the result should be precisely the same in degree. It must be the same in kind, and effected by the employment of his mode of operation in substance. Whether, in point of fact, the defendant's cars did copy the plaintiff's invention, in the sense above explained, is a question for the jury, and the court below erred in not leaving that question to them upon the evidence in the case, which tended to prove the affirmative.

The judgment of the court below must be reversed.

Mr. Chief Justice TANEY, Mr. Justice CATRON, Mr. Justice DANIEL, and Mr. Justice CAMPBELL, dissented.

Mr. Justice CAMPBELL.

I dissent from the opinion of the court in this case.

The plaintiff claims to have designed and constructed a car for the transportation of coal on railroads which shall carry the heaviest load, in proportion to its own weight.

His design consists in the adoption of the "conical form" "for the body of the car," "whereby the weight of the load presses equally in all directions;" does not "tend to change the form of the car;" permits it "to extend down within the truck," lowering "the centre of gravity of the load," and by its reduced size at the bottom adding to its strength and durability. He claims as his invention, and it is the whole of the change which he has made in the manufacture of cars, "the making of the body of the car in the form of the frustum of a cone."

It is agreed that a circle contains a greater area than any figure of the same perimeter; that the conical form is best suited to resist pressure from within, and that the reduced size at the bottom of the car is favorable to its strength. The introduction of the cars of the plaintiff, upon the railroad, for the transportation of coal, was attended by a great increase of the loads in proportion to the weight of the car. The merits of the design are frankly conceded. Nevertheless, it is notorious, that there does exist a very great variety of vessels in common domestic use, "of a conical form," or, "of the form of the frustum of a cone," for the reception and transportation of articles of prime

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necessity and constant demand, such as water, coal, food, clothing, &c. It is also true that the properties of the circle, and of circular forms alluded to in the patent of the plaintiff, are understood, and appreciated, and have been applied in every department of mechanic art. One cannot doubt that a requisition from the transportation companies for cars of a diminished weight, and an increased capacity, upon the machinists and engineers connected with the business, would have been answered promptly by a suggestion of a change in the form of the car. The merit of the plaintiff seems to consist in the perfection of his design, and his clear statement of the scientific principle it contains.

There arises in my mind a strong if not insuperable objection to the admission of the claim, in the patent for "the conical form," or the form of the frustum of a cone," as an invention. Or that any machinist or engineer can appropriate by patent a form whose properties are universally understood, and which is in very common use, in consequence of those properties, for purposes strictly analogous. The authority of adjudged cases seems to me strongly opposed to the claim. *Hotchkiss v. Greenwood*, 11 How. 249; *Losh v. Hague*, Web. Pat. Cas. 207; *Winans v. Providence Railroad Company*, 2 Story, 412; 2 Id. 190; 2 Car. & Kir. 1022; 3 W. H. & Gord. 427.

Conceding, however, that the invention was patentable, and this seems to have been conceded in the Circuit Court, the inquiry is, what is the extent of the claim? The plaintiff professes to have made an improvement in the form of a vehicle, which has been a long time in use, and exists in a variety of forms. He professes to have discovered the precise form most fitted for the objects in view. He describes this form, as the matter of his invention, and the principle he develops applies to no other form. For this he claims his patent. We are authorized to conclude, that his precise and definite specification and claim were designed to ascertain exactly the limits of his invention. *Davis v. Palmer*, 2 Brock. 298.

The car of the defendants is of an octagonal form, with an octagonal pyramidal base. There was no contradiction, in the evidence given at the trial, in reference to its description, nor as to the substantial effects of its use and operation. In the size, thickness of the metal employed in its construction, weight, and substantial and profitable results, the one car does not materially vary from the other. The difference consists in the form, and in that, it is visible and palpable.

The Circuit Court, acting upon these facts, of which there was no dispute, instructed the jury that an infringement of the plaintiff's patent had not taken place. I do not find the ques-

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tion before the court a compound question of law and fact. The facts were all ascertained, and upon no construction of those facts was the plaintiff, in my opinion, entitled to a judgment.

In theory, the plaintiff's car is superior to all others. His car displays the qualities which his specification distinguishes. The equal pressure of the load in all directions; the tendency to preserve the form, notwithstanding the pressure of the load; the absence of the cross strain; the lowering of the centre of the gravity of the load,—are advantages which it possesses in a superior degree to that of the defendants'. Yet the experts say that there is no appreciable difference in the substantial results afforded by the two.

The cause for this must be looked for in a source extrinsic to the mere form of the vehicles. Nor is it difficult to detect the cause for this identity in the results in such a source.

The coarse, heavy, cumbrous operations of coal transportation do not admit of the manufacture of cars upon nice mathematical formulæ, nor can the loads be adjusted with much reference to exactness. There is a liability to violent percussions and extraordinary strains, which must be provided for by an excess in the weight and thickness of the material used. Then, unless the difference in the weight of the load is great, there will be no correspondent difference in the receipts of the transportation companies.

The patentee, not exaggerating the theoretical superiority of the form of his car, overlooked those facts which reduced its practical value to the level of cars of a form widely variant from his own. The object of this suit is to repair that defect of observation. It is, that this court shall extend, by construction, the scope and operation of his patent, to embrace every form which in practice will yield a result substantially equal or approximate to his own.

In the instruction asked for by the plaintiff, "form and circumstances" are treated as more or less immaterial, but the verdict is claimed if the defendants have constructed cars "which, substantially on the same principle and in the same mode of operation, accomplish the same result."

The principle stated in the patent applies only to circular forms.

The modes of operation in coal transportation have experienced no change from the skill of the plaintiff, except by the change from the rectilinear figure to the circular.

The defendant adheres to the rectilinear form. The result accomplished by the use of the two cars is the same—a more economical transportation of coal. This result it is that the

plaintiff desires to appropriate, but this cannot be permitted. Curtis on Patents, § 4, 26, 27, 86, 87, 88; 2 Story, 408, 411.

In the case of *Aiken v. Bemis*, 3 Wood. & M. 349, the learned judge said, "When a patentee chooses to cover with his patent the material of which a part of his machine is composed, he entirely endangers his right to prosecute when a different and inferior material is employed, and one which he himself, after repeated experiment, had rejected."

The plaintiff confines his claim to the use of the conical form, and excludes from his specification any allusion to any other. He must have done so advisedly. He might have been unwilling to expose the validity of his patent, by the assertion of a right to any other. Can he abandon the ground of his patent, and ask now, for the exclusive use of all cars which, by experiment, shall be found to yield the advantages which he anticipated for conical cars only?

The claim of to-day is, that an octagonal car is an infringement of this patent. Will this be the limit to that claim? Who can tell the bounds within which the mechanical industry of the country may freely exert itself? What restraints does this patent impose in this branch of mechanic art?

To escape the incessant and intense competition which exists in every department of industry, it is not strange that persons should seek the cover of the patent act, for any happy effort of contrivance or construction; nor that patents should be very frequently employed to obstruct invention, and to deter from legitimate operations of skill and ingenuity. This danger was foreseen, and provided for, in the patent act. The patentee is obliged, by law, to describe his invention, in such full, clear, and exact terms, that from the description, the invention may be constructed and used. Its principle and modes of operation must be explained; and the invention shall particularly "specify and point" out what he claims as his invention. Fullness, clearness, exactness, preciseness, and particularity, in the description of the invention, its principle, and of the matter claimed to be invented, will alone fulfil the demands of Congress or the wants of the country. Nothing, in the administration of this law, will be more mischievous, more productive of oppressive and costly litigation, of exorbitant and unjust pretensions and vexatious demands, more injurious to labor, than a relaxation of these wise and salutary requisitions of the act of Congress. In my judgment, the principles of legal interpretation, as well as the public interest, require, that this language of this statute shall have its full significance and import.

In this case the language of the patent is full, clear, and exact. The claim is particular and specific.

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Neither the specification nor the claim, in my opinion, embrace the workmanship of the defendants. I therefore respectfully dissent from the judgment of the court, which implies the contrary.

Order.

This cause came on to be heard on the transcript of the record from the Circuit Court of the United States for the District of Maryland, and was argued by counsel. On consideration whereof, it is now here ordered and adjudged by this court, that the judgment of the said Circuit Court in this cause be, and the same is hereby reversed, with costs, and that this cause be, and the same is hereby remanded to the said Circuit Court, with directions to award a *venire facias de novo*.

CLINTON WALWORTH, PLAINTIFF IN ERROR, v. JAMES KNEELAND AND HANNAH HIS WIFE, AND FRANCES CORNELIA FOSTER AND WILLIAM FOSTER, INFANTS, BY THEIR NEXT FRIEND, JAMES KNEELAND.

Where a case was decided in a State court against a party, who was ordered to convey certain land, and he brought the case up to this court upon the ground that the contract for the conveyance of the land was contrary to the laws of the United States, this is not enough to give jurisdiction to this court under the 25th section of the judiciary act.

The State court decided against him upon the ground that the opposite party was innocent of all design to contravene the laws of the United States.

But even if the State court had enforced a contract, which was fraudulent and void, the losing party has no right which he can enforce in this court, which cannot therefore take jurisdiction over the case.

THIS case was brought up from the Supreme Court of the State of Wisconsin, by a writ of error issued under the 25th section of the judiciary act.

The case is stated in the opinion of the court.

It was submitted, on a printed brief by Mr. Smith, on behalf of the plaintiff in error, and argued by Mr. Baxter, for the defendants in error.

The counsel for the plaintiff in error made the following points.

1st. The contract in which this suit originated was made in violation of the act of Congress, approved March 3d, 1807, entitled "An act to prevent settlements being made on lands ceded to the United States, until authorized by law. 2 U. S. Stat. 445.